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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.      | CONFIRMATION NO. |
|---|-------------|----------------------|--------------------------|------------------|
| 10/799,282  | 03/13/2004  | Matthew E. Colburn   | IBM-272                  | 7196             |
| 7590  | 10/30/2007  |                      | EXAMINER                 |                  |
| Thomas A Beck<br>6136 West Kimberly Way<br>Glendale, AZ 85308 |             |                      | MALEKZADEH, SEYED MASOUD |                  |
|   |             |                      | ART UNIT                 | PAPER NUMBER     |
|   |             |                      | 1791                     |                  |
|   |             |                      | MAIL DATE                | DELIVERY MODE    |
|   |             |                      | 10/30/2007               | PAPER            |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

|                              |  |                                    |
|------------------------------|--|------------------------------------|
| <b>Office Action Summary</b> | Application No.                              | Applicant(s)                       |
|                              | 10/799,282<br>Examiner<br>SEYED M MALEKZADEH | COLBURN ET AL.<br>Art Unit<br>1791 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 10 July 2007.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-64 is/are pending in the application.
- 4a) Of the above claim(s) 2-12, 14-50, 58, 59 and 61-64 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1, 13, 51, 57 and 60 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 13 March 2004 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Election/Restrictions***

Applicant's election of group I, claims 1, 13, 51-57, and 60 in the reply filed on 07/10/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim 2-12, 14-50, 58-59, and 61-64 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected groups II - IV, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 07/10/2007.

***Information Disclosure Statement***

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

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***Oath/Declaration***

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because It does not include the notary's

Signature, or the notary's signature is in the wrong place. In the second page of the Oath/Declaration, notary's signatures for two of inventors are missed.

***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p) (5) because they do not include the following reference sign(s) mentioned in the description: Figure 1, Figure 3, 2-230, 2-240, 3-260, 3-270. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be

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labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: I-240, I-230, 4-120. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the limitation "said mold substrate" in first line of the claim 13. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 13, 55-57, and 60 are rejected under 35 U.S.C. 102(e) as being anticipated by Shih et al. (US 2004/0029041)

Shih et al (041) teach a system for contact planarization and precursor structures formed by those methods, which provide globally planar surfaces for photolithographic, imprint, and hot-embossing lithography.

Further Shih et al (041) teaches a multilevel mold for imprint lithography that contains a dual damascene structure. (See paragraphs [0012]-[0014] and figures 3c and 3(d))

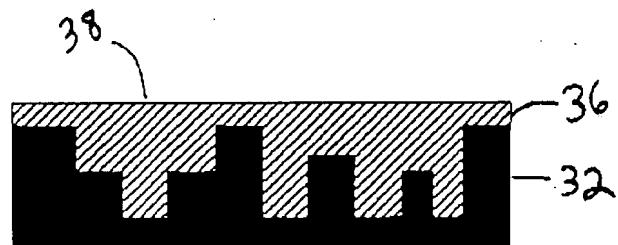


Figure 3 (c)

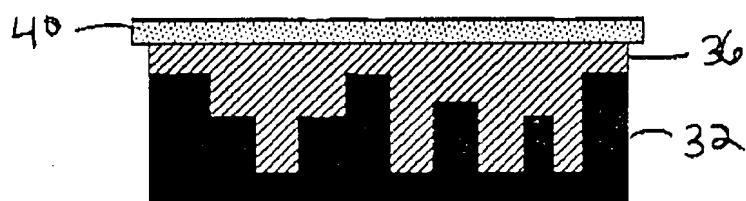


Figure 3 (d)

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Furthermore, as to claim 13, Shih et al (041) teaches the mold substrate is a material selected from quartz. (See paragraph 17)

Also, as to claims 55 - 57, Shih et al (041) discloses the mold incorporates recessed regions wherein the recessed regions are on the periphery of the imprint pattern and also recess region are pre-measured in order to provide a reference surface. (See paragraph [0023])

Furthermore, as to claim 60, Shih et al (041) discloses a second-generation mold that is fabricated by embossing a master mold into a curable material that is coated on a second-generation mold. (See paragraphs [0013] and [0014])

The prior art, thus, meets all the claim limitations, and therefore Shih et al (041) anticipates claims 1, 13, 55-57, and 60.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at

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the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al (041) in view of Westmoreland (US 2002/0185584).

Shih et al (041) disclose all the structural limitations of a multilevel mold for imprint lithography, however, fail to teach the mold is treated with a low surface energy component which is a fluorinated self assembly monolayer such as a fluorinated alkyl halosilane, fluorinated alkyl alkoxy silane, fluorinated alkyl acetoxy silane and tridecafluoroctyltrichlorosilane.

Westmoreland ('584) teaches a surface modification of the planar surfaces of the molds such as quartz molds used in

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forming planar surfaces on wafers during fabrication of semiconductor devices. (See paragraph [0011])

Further, Westmoreland ('584) teaches the contact surface of a mold is treated or modified with chemical compounds, which are fluorinated on the alkyl portion of the chemical structure. Suitable chemical compounds for modifying the mold surface include fluoroalkylsilanes that are long chain fluoroalkyl-halosilanes. (See paragraph [0025])

Also, Westmoreland ('584) discloses the advantages of treating or modifying surface of a mold with chemical compounds in order to provide effective non-stick characteristics and a mold surface that is resistant to abrasion or wear. (See paragraph [0011])

Therefore, it would have been obvious for one of ordinary skill in the art at the time of applicants invention to modify a mold for imprint lithography of Shih et al (041) by treating the surface of the mold with a low surface energy component which is a fluorinated self assembly monolayer in order to provide effective non-stick characteristics and a mold surface that is resistant to abrasion or wear, as suggested by Westmoreland ('584).

Claims 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al (041) in view of Sreenivasan et al. (US 7,136,150)

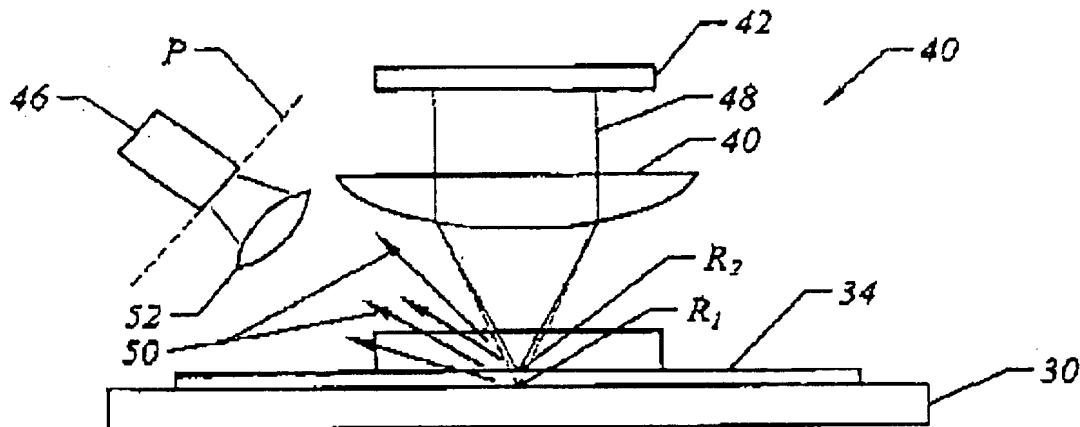
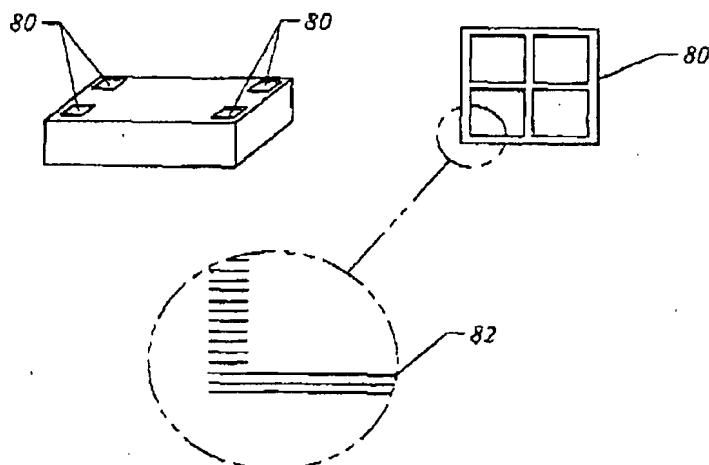
Shih et al (041) discloses all the structural limitations of a multilevel mold for imprint lithography, however, fail to teach alignment marks are incorporated into a structure of the mold wherein the alignment marks are such as diffractive grating, moiré fringe, chirped, verniers and box-in-box patterns, as claimed in claim 53, also further Shih et al (041) do not teach one or more of the materials are patterned with alignment marks, as claimed in claim 57.

In the analogous art, Sreenivasan et al. ('150) teach a template with alignment marks that are opaque to selective wavelength of light. Also teaches the template is provided having patterning areas and a template, with the template mark being formed from metal and disposed outside of the patterning areas. (See abstract)

Further, Sreenivasan et al. ('150) disclose a lithographic apparatus (10) that includes an optical imaging system (40) with a light source (42) and an optical train (44) to focus light upon substrate (30). Optical imaging system (40) is configured to focus alignment marks lying in differing focal planes onto a

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single focal plane, P, wherein an optical sensor 46 may be positioned. (See lines 9-14, column 5; figures 7-8 and 11)

*FIG. 7**FIG. 11*

Also Sreenivasan et al. ('150) teaches different alignment marks may be employed, such as vernier marks (68 and 70), as well as Moire gratings (72 and 74). (See lines 38-42, column 5)

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Furthermore, Sreenivasan et al. ('150) discloses the advantages of providing a template having alignment marks in order to proper orientation of the template with the substrate and properly aligning the template with an existing patterned layer so that the proper orientation between the existing patterned layer and a subsequent patterned layer is obtained. (See lines 1-6, column 2)

Therefore, it would have been obvious for one of ordinary skill in the art to modify the mold apparatus of Shih et al (041) by providing alignment marks such as verniers, which incorporate into structure of the mold to pattern the mold material in order to proper orientation of the template with the substrate and properly aligning the template with an existing patterned layer, as suggested by Sreenivasan et al. ('150).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Masoud Malekzadeh whose telephone number is 571-272-6215. The examiner can normally be reached on Monday - Friday at 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra N. Gupta can be reached on (571) 272-1316. The fax number for the organization where this application or proceeding is assigned is 571-272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SMM

  
YOGENDRA N. GUPTA  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700